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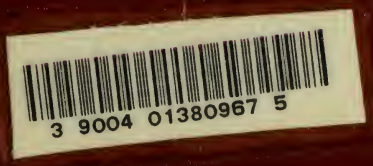

1881 H3

SUGGESTIONS

—TO—

Encourage Settlement

AND SECURE

RAPID DEVELOPMENT

—OF THE—

WHEAT LANDS

—OF—

Minnesota and Dakota,

TRIBUTARY TO THE

NORTHERN PACIFIC RAILROAD.

THE MINNEAPOLIS TRIBUNE
BOOK AND JOB STEAM PRINTING ESTABLISHMENT.
1881.

INTRODUCTION.

The following pages were prepared in response to inquiries by parties who proposed to purchase lands in Minnesota and Dakota, and develope and improve them by means of cheap railroads.

The requests for explanation of the system have become so numerous that the writer has concluded to give the manuscript for publication, as the most satisfactory manner in which the information can be communicated.

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DEVELOPMENT OF WHEAT LANDS.

ST. PAUL, MINN., May 28th, 1881.

GENTLEMEN:

Your communication of the 20th inst. has been received, and appreciating the importance of the subject to which it relates, I lose no time in returning a reply as requested.

I see no reason to change the opinion previously expressed, that in a prairie country, such as western Minnesota and Dakota, without timber, stone or fuel, the only way to facilitate the rapid settlement of the country is by lateral railroads and cheap transportation for all supplies.

My first idea was to construct a system of wooden railroads, at intervals of twenty miles north and south of the main line, and extended on each side to a maximum distance of about fifty miles; but when I began to figure on the production of the tributary area, even with ten per cent. only, of the land under cultivation, I found that the tonnage would be so great that the capacity of such a road would quickly be exceeded, and that for this reason the pioneer wooden road should be so constructed as to permit its convenient transformation, at any time, into a road of iron or steel rails, on which ordinary cars and engines could be used, and confine the wooden roads for permanent use to maximum lengths of about twenty miles.

Instead, then, of constructing branches at right angles to the main line at intervals of twenty miles, as first proposed, I would extend the intervals to fifty miles, and at points twenty miles apart on the branch lines I would run parallels to the main line; the length of these parallels being twenty miles also, leaving intervals at the ends of the parallels of ten miles. [See diagram.]

I would start this system by commencing with a wooden railroad, constructed as hereinafter described, at right angles to the main track, and extended for a distance of twenty miles.

The area tributary to the branch, within ten miles haul, would be 457 square miles from both sides, and the areas tributary to each twenty miles of parallels would be 320 square miles in addition.

When twenty per cent. of this area had been brought into cultivation, the branch road, at twenty bushels per acre, would furnish over 1,000,000 bushels, and the two twenty mile parallels 1,500,000 more, making the total delivery at the intersection of the branch with the trunk line, from the twenty miles of branch and forty miles of parallel, over 2,500,000 bushels.

Before this development would be reached, which is only one-fifth of the tributary area, iron or steel rails must be laid on the branch, but the parallels, which will never exceed twenty miles in length, with an average haul not exceeding fourteen miles, can be operated and maintained as wooden railroads indefinitely.

When the lands embraced between the main line and the first twenty mile parallel have been sufficiently settled and improved, the branch can be extended twenty miles more, and a second parallel constructed in a similar manner, to be followed by a third or fourth if found expedient.

The plan of operation would be to commence by constructing the branch at right angles as a wooden railroad operated by horse-power.

When the production increased sufficiently, light engines of about six tons would be substituted for the horses, capable of hauling six small cars of six tons gross, or four tons net load each, on grades as high as 100 feet per mile.

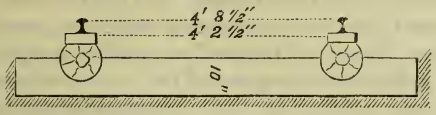
When the development of business required the construction of the first parallel, iron or steel would be laid on the branch, and the small engines and cars transferred to the parallels, where they would always find work adapted to them.

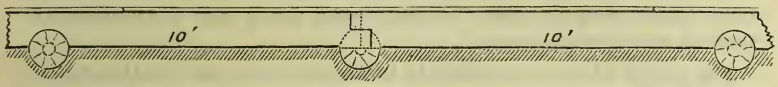
Moderately heavy engines and ordinary cars would be used on the branches, and the elevators at which cars would be loaded would be located at the intersections of the branches and the parallels.

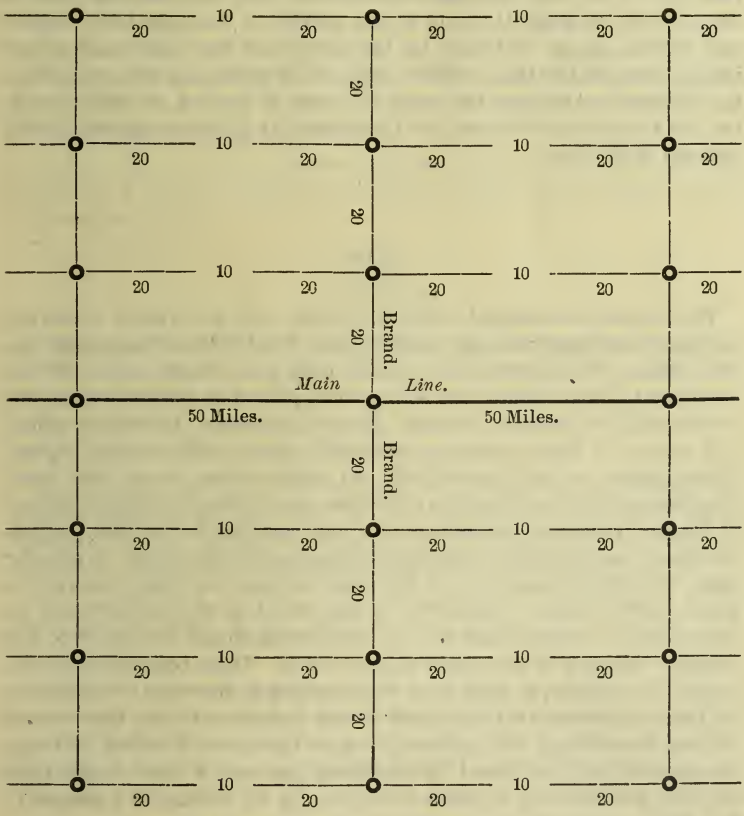
To trace the development of this system and its results it will be necessary to explain the mode of construction and capacity of the wooden railroads.

These roads, as now proposed, are quite different from the ordinary tram-ways of wood, which consist of small scantling, 4 x 4, laid on cross ties. Such rails wear rapidly under the action of iron wheels, and twist and warp so that the results are very unsatisfactory.

PROPOSED WOODEN ROADS.



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The roads proposed are constructed, if the ground is level, by laying transverse tie logs, ten inches or more in diameter and ten feet long, at intervals of ten feet, in trenches eighteen inches deep. On these ties two rows of longitudinal rail timbers, also ten to twelve inches in diammeter, are placed, the upper surfaces of which are hewed flat to a width of eight inches. These rail timbers are notched and pinned to the cross sills by two inch pins and supported for the entire length by earth.

On top of these rail timbers, rails of hard wood eight inches wide and three inches deep are spiked, so as to break joints with the joints of the timbers on which they rest.

The gauge of this track should be four feet two and a half inches, so that when it becomes necessary to substitute iron rails, nothing need be done except to spike the iron in the middle of the eight inch wooden rail, and the gauge will then be the usual four feet eight and a half inches, upon which the ordinary cars and engines can run; and when the longitudinal timbers rot, cross ties may, if desired, be substituted, but the longitudinal timbers can be renewed at the same expense as the renewal of the ties.

CARS.

The cars are constructed without springs; and the wheels, which are the most important part, are made of hard wood with a rim of cast iron for a flange. To construct the wheels, take good white oak, locust or other hard plank, about eight inches wide, planed on both sides and cut in the shape of circular sectors. Four thicknesses of two-inch plank laid over each other, breaking joint, will give a width of eight inches. These planks are well spiked with cut spikes driven from both sides. The diameter of the wheels may be from twenty-four to thirty inches. A flange of cast iron, in the form of a ring, is bolted to the side, projecting about one inch and a half beyond the tread of the wheel. A circular plate is bolted on each side of the wheel to cover the sharp ends of the plank at the center. The width of the wheel at the center would be nine inches. Boxes of cast iron, of cylindrical shape, are inserted and securely fastened in the center of each wheel. These boxes should have ribs on the outside, to keep them from turning in the wood; they should be bored inside for two and a half inches diameter of axle; they should be nine inches long, with at least one inch thickness of metal, and may be cemented into the wheel by mortising the hole a little larger than the box and pouring in melted sulphur, or by driving in a cement of iron filings and sal-ammoniac, or in various other ways.

Care must be taken that the hub is set square with the plane of the

flange, and accurately centered. If the hubs are cast against a smooth core it will not be necessary to bore them—they will very soon wear smooth.

The axles are of two and a half inch round iron; they should be long enough to project through the hub sufficiently far to admit of a small cast washer and nut or lynch-pin. On the inside a ring is shrunk on the axle at such distance from the end as to admit of a half-inch washer between the ring and the hub.

As the wheels turn on the axles, no boxes are required, and the frame consists of scantling laid across the axles and fastened with stirup-bolts. The wheels should be not more than two feet apart, or four and a half feet between axles, to allow sharp curves to be turned with facility.

It is not proposed that these cars shall run at higher speed than six or eight miles per hour; they should carry four to five tons each, and cost less than an ordinary farm wagon. They would be without springs and would have a maximum distance to run at each trip of twenty miles, and an average of about twelve miles.

At first they would be hauled by horse power, but as the business developed a point would soon be reached where small engines would be more economical.

ENGINES.

The engines proposed to be used would weigh about six tons. They would have four drivers with adhesion of total weight. The tires might be of hard rubber, which is reported to have been used successfully on traction engines for stone roads in England, and would give great adhesion on the wooden rail.

The average traction of a train under ordinary conditions and average speed, is about nine pounds per ton on a straight and level road, but on a wooden railroad the conditions would be different, the traction greater and the exact amount determinable only from actual experiment.

It is not probable, however, that the traction on such road on a level would exceed twenty pounds per ton, and the calculations will be made on this basis.

A traction of twenty pounds per ton on a level could give an angle of fraction of forty-seven feet to the mile, at which the resistance would be doubled or the gross load of an engine reduced to one-half. At ninety-four feet to the mile the gross load would be reduced to one-third, and this, on a prairie country, may be taken as a reasonable limit of grade.

An engine of six tons, all the weight on four drivers, would have adhesion of not less than 2,400 pounds, and would haul, at twenty pounds

per ton, 120 tons, gross, on a level, or forty gross tons on a grade of ninety-four feet.

This would be six cars in addition to engine, and it would require six trains of six cars for 100 days to carry 500,000 bushels on the average haul of the parallels.

If the charge on the branch and lateral roads for the average distance carried should be equal to the cost of haul on a common road for ten miles, we would have two horses, wagon and driver, one day, hauling one and one-half tons, ten miles and back, at three dollars per day, say fifty bushels, or six cents per bushel.

A train of six cars=twenty-four tons=800 bushels would earn $48.00 at same price per bushel.

The pay of an engineer would be $2.50 per day, and no fireman would be required for one of these little six ton engines.

The cost of fuel, oil, waste and repairs would be covered fully by $2.50 more, making, say $5.00, and including cars and contingencies, the whole would be very liberally covered by $10.00 per day. This should be paid by return freights, in fuel, timber, supplies and passengers; but call the net earnings $40.00 per day, per train, six trains per day would pay 6x40=$240, and for 100 days, during which the wheat movement is supposed to continue, the aggregate would be $24,000.

As each engine would make easily two round trips daily, the equipment in service on each parallel would be three engines and eighteen cars, costing, say, $14,000; and adding the cost of the road, $20,000, the total capital would be $34,000 for the track and equipment of one of the twenty mile parallels. The second parallel, of the same length, would, of course, cost the same.

The branch of twenty miles at right angles to the main line, if laid with forty pound steel rails, at $70.00 per ton, would cost $5,500 per mile, or, allowing for contingencies $6,000, or $120,000 for the twenty miles.

No provision need be made for equipment on the branch, as the cars of the trunk line will be sent to the elevators, and the company operating the trunk line would probably be willing to gather the wheat on the branch for the profits of transportation on the trunk line.

But if this should not be conceded, the charge for use of cars would probably not exceed the usual allowance per car per mile; and for the whole length of the branch, twenty miles, this charge, including engine service, would be less than half a cent per bushel.

The cost of twenty miles of steel rail track, and forty miles of wooden rail feeders, with the equipment of the wooden roads, would therefore be:

Twenty miles Steel Track	$120,000
Forty miles Wooden Track	40,000
Six Small Engines	24,000
Forty Small Cars	4,000
Total	$188,000

Allowing for contingencies, the estimate may be taken at $200,000 for the whole system of sixty miles and necessary equipment.

It has been shown that if 20 per cent. of the tributary area be brought into cultivation, and the yield be twenty bushels per acre, the amount of wheat deliverable at the junction of the branch and main line would be 2,500,000 bushels from *one side* of the main track only. Of course the other side would have equal capacity, and the extension of the branches and parallels for each twenty miles would add equally to the product; so that a development of sixty miles on each side would figure up 15,000,000 bushels as the contribution to traffic from fifty miles of road and 20 per cent. of area under cultivation.

But we will confine our calculation to the 2,500,000 contributed by the first twenty miles of branch and forty miles of parallels. This amount, at six cents per bushel, would yield $150,000; and if other business be assumed as sufficient to pay cost of operation and repairs, the $150,000 would be a very satisfactory annual dividend on an investment of $200,000.

But the chief profits would be derived from the increased value of the lands. By this system no settler would be more than ten miles from a railroad, and the average distance would be only five miles.

Lands at this distance from a railroad should be appreciated in value at least $2.00 per acre; and as the tributary area would exceed 1,000 square miles, or 640,000 acres, the appreciation would be $1,280,000, or six times the cost of the railroad and its equipment; and if only $1.00 per acre be added to the value of the lands the appreciation would still be more than three times the cost of roads and equipment. Whether it would pay parties to form syndicates, purchase lands, build the proposed branches, erect houses and go into the business of establishing settlements, are questions that capitalists must decide for themselves. I have given figures which may assist in reaching a conclusion, There may be a difficulty in securing lands, as those belonging to the Government are sold only to individuals in quarter sections, and the tracts of considerable size that were formerly purchased of the company are held generally at prices too high to leave those who might desire to purchase a sufficient margin. These conditions are unfavorable, and present obstacles to the rapid improvement and development of the country which cannot readily be removed. The best plan perhaps would be to try to induce owners to contribute lands at fair prices to the syndicate, and become interested therein.

The practical difficulties in the way of its application do not alter the fact that a system of cheap railroads, by which every settler can be brought within less than ten miles of a railroad, and fuel and supplies of all kinds delivered to him cheaply, is the only means by which a prairie country can be rapidly settled and its capacity for production

utilized. The wheat from an acre of land will pay, at fifteen cents per bushel, $3.00 per acre per annum for its transportation to the lakes. It would pay railroad companies to give their lands for nothing, if only by so doing they could insure their cultivation, and secure thereby the profits of transportation of the products. If only one-half of the $3.00 should be profit, it would pay six per cent. per annum on $25.00 per acre.

I have no wish to prescribe a policy for railroad companies or others. The point I make is simply this: that railroad companies have so much interest in encouraging the settlement of the country and increasing the agricultural products, that the price per acre realized for the land is of comparatively little consequence, and it would seem to be preferable to give the lands to those who would improve them, rather than hold at such high prices as to leave them unproductive and unoccupied.

Although government lands cannot be purchased in large blocks, it may be worthy of consideration, whether a syndicate might not promote rapid settlement by poor but industrious and thrifty families on these lands, and increase production, by getting citizens or others who intend to become citizens, to locate and occupy quarter sections, under the pre-emption and homestead acts. The syndicate could advance money, under satisfactory security, to make the payments to the government, erect buildings, furnish outfit and support until a crop could be marketed; in consideration whereof, the settler, under a contract that would protect the capitalist, could agree to bring into cultivation a given number of acres each year, and sell to the syndicate the product thereof, for a fixed number of years, at a price that would allow a fair margin for the advances made. The syndicate could own the elevators, buy the wheat, furnish settlers with fuel and all other supplies, and thus add to their profits in many ways besides the simple earnings of the road in transportation.

I would further suggest that on each square mile the dwellings for the four quarter sections might be placed in or near the middle, so that the occupants would be near neighbors, a great advantage, if congenial, in case of sickness or for social intercourse.

Groups of four families, associated by choice, could settle together, and a single well might suffice for all. The dwellings could be surrounded by a grove of trees, which would render them attractive, furnish shade in summer, and break the force of winds in winter. Large groves should also be set out to furnish fuel after eight or ten years.

The chief obstacle to tree culture on the prairies is fire; but by plowing a few furrows two rods apart around the plantation of trees, and burning the grass between, at the proper season, a perfect protection can be secured both for trees and dwellings, and in a few years settlers will be entirely independent of railway transportation for their fuel. This tree planting might be done on a large scale, systematically and

economically, by the syndicate, and retained under proper supervision so long as necessary for the protection of the young groves, the expense to be added to the price to be paid by the settler for the purchase of the property.

This important work could be done thoroughly and economically by the syndicate, under charge of a competent agent or superintendent, and would be more certain to be well done than if left to the option of individuals.

At the middle point of each square of four miles, or sixteen sections, a church and school-house should be located. The greatest distance in a direct line from the most remote dwelling in the square would then be two and one-eighth miles. A village should be established at the same place, in which tradesmen, shoemakers, blacksmiths, wagonmakers, carpenters, storekeepers and a physician, druggist and others could locate.

When the development extended to sixty miles on each side of the trunk line, and full settlements had been effected on each quarter section, the tributary area for fifty miles of trunk line would be over 6,000 acres, and the number of families on the farms 24,000 in addition to the number collected in the villages. At the intersection of the branches with the trunk line cities of considerable size must spring up, and large towns at the intersections of the branches and parallels.

Many readers will regard these computations as visionary and theoretical, but those who are familiar with the productive capabilities of west Minnesota and Dakota, will not consider the estimate as greatly exaggerated

It assumes only twenty per cent. of the tributary area under cultivation. It also assumes that if a syndicate of capitalists will take up lands, erect houses, furnish stock and implements, food, fuel and other supplies, and wait until crops are harvested and sold to be reimbursed, there can be no difficulty in securing a good class of settlers to occupy the farms and develope the country.

In a few years they would own their homes and be comparatively rich and independent, with no fear of want, and with all the means presented by schools and churches for the mental and moral improvement of their children.

When the Pennsylvania railroad went into operation, with a business of about 100,000 tons per annum, I was regarded as a visionary enthusiast for reporting, as Chief Engineer, that under a proper policy of local development, the business of the company could be increased to a million of tons annually. It was not many years before the actual development exceeded this estimate ten fold. I consider the estimate here made as conservative rather than extravagant, provided such a policy be adopted as has been indicated to secure rapid settlement.

With labor, such results are possible, without it, nothing; labor is the great desideratum, and it can be quickly secured by proper inducements, and by such inducements only.

The construction of ordinary railroads will, of course, lead to settlement and increase production, but the progress will be slow if the class of settlers be limited to parties who are rich enough to buy stock and improve farms, and support themselves while waiting for returns. Where one possesses the ability to do this there will be ten who cannot; and yet, with aid, they might make industrious and worthy citizens.

You will understand that this communication is entirely personal and unofficial.

I know not what may be the policy of the Northern Pacific Railroad Company in regard to the encouragement of such an enterprise as you propose, and I would not undertake to prescribe a policy for them. I give only my opinion as an individual. If any special arrangements are desired or any propositions to be made for the purchase of lands, at any other than at established prices and conditions, such proposition should be submitted to the president and directors.

Yours very respectfully,

H. HAUPT.